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Prof. John A. Church has recently written a book on "The Formation and History of the Comstock Lode." His account of Comstock geology differs essentially from this. He concurs with his predecessors in regard to the position and order of the rocks and the presence of a dike under the lode; but he gives to the rocks and to the lode itself a different history. He finds that the diorite and propylite are both stratified, and their strata are approximately conformable.

They were laid down in the horizontal position, and have been elevated into a mountain range by the ordinary operation of pressure and folding. The dikes of andesite have not broken through cracks opened across the other rocks, but are bedded, interposed between the strata of diorite and propylite. The openings between these strata were not originally so thick as the quartz seams now are. At first they were the merest partings between two layers of the propylite; and in accounting for the development of these insignificant crevices to ore-bodies two and three hundred feet thick, Mr. Church advances one of the most important observations of his book.

He takes the bold ground that the Comstock is not a true fissure vein; but that it has been formed by the process of substituting quartz for the propylite in certain localities, which were prepared for the process in a way described by him.

The lode lies on one of the andesite dikes, and the metal-bearing water rose up the face of this dike, and penetrated the propylite strata whenever they had been opened.

This water was siliceous, and attacked the propylite rock, dissolving it and depositing silica in its place. Each layer of propylite was attacked on two sides, until finally the whole layer was removed, and the two seams of quartz met. The layers of propylite are of all thicknesses, from a few feet up to many yards, and when a number of them were involved in the process of substitution, some would be completely removed, when others were only half dissolved away. If the process of substitution stopped at this stage, the result would be a mass of quartz inclosing streaks and layers of propylite, just as the structure is found to exist at the edges of the quartz bodies.—*Engineering and Mining Journal*.

GEOGRAPHY AND TRAVELS.¹

ASIA.—Col. Prejevalsky having passed through Bulun-tochoi, up the Urungu river, crossed the southern Altai mountains to Barkul, arriving at Hami about May 30, 1879. Hami is at the extremity of the sandy steppe described as the Mouschoun Gobi; it is a desert almost destitute of vegetation with great tracts of clay covered with gravel. While the temperature of the air was as high as 38° C., the soil had sometimes a temperature of 68° C. The only animals of large size seen were the antelope and wild camel. Prejevalsky crossed this desert in a south-eastern

¹ Edited by ELLIS H. YARNALL, Philadelphia.

direction for 232 miles to the oasis of Sha-chau—about E. long. 94°, lat. 39°⁰¹—reaching there on the 20th of June. He states that the desert attains at one point an elevation of 5000 feet, but that the Sha-chau oasis, which he describes as very fertile, is only 3500 feet above the sea. Southwards there runs a range covered with perpetual snow, and evidently to be identified with the Altyn-tagh of his former journey to Lob-Nor. It is here joined by the Nian-Shan of Koko-Nor. This portion of Mongolia being very little known, it is likely our knowledge of it will be much increased. The latest news of this intrepid traveler comes by way of Pekin, and reports him as having reached the southern part of the province of Tsaidam on the northern frontier of Tibet. The route from there to Lhasa is known, partly through Prejevalsky's own researches in 1872, and partly from Huc and Gabet's journey.

Count Széchényi having, as stated in the *NATURALIST* for November, 1879, been obliged to abandon his attempt to cross the Kum Tagh to the Lob-Nor, made a journey southwards from Su-chow-fu, visiting the high range forming the northern boundary of the plains of Tsaidam. Then returning to Su-chow-fu he proceeded south-easterly to Si-ning-fu through a mountainous region constituting the basin of the river Tatung, a tributary to the Yellow river. These mountains attain the limits of perpetual snow and are called Nan Shan. Si-ning-fu is situated at the foot of lofty snow-clad mountains (14,500 feet), in a well cultivated country, and is the principal depot of the rhubarb trade between China and Russia. He next endeavored to reach Lhasa by the direct route over the high plateau of Tibet, the road followed by Père Huc, but could not advance further than the Odantala plain where the Yellow river rises. The party left Si-ning-fu on August 12, 1879, and reached Cheng-tu-fu, the capital of Szechuen, at the beginning of October. This route is quite unknown, and passes over the water-sheds of the two great rivers, the Yellow and the Yang-tse-kiang. Széchényi's arrival on the 24th of October at Ta-chiën-lu has been reported at Pekin. Notwithstanding the efforts of the Chinese to dissuade him from continuing his journey into Tibet and the reported hostility of the natives of that country, he, when last heard from, was continuing his journey to Batang and Lhasa.

The immense coal fields of China are slowly being developed. On the upper Yang-tse-kiang a coal field has been found extending over seventy-five square miles. In one bed lying only a hundred feet from the surface at least 1,200,000 tons of anthracite have been exposed.

The *Academy* states, on the authority of the British Consul at

¹ The best map on which to trace this portion of Prejevalsky's route we have found to be Tafel 1, *Petermann's Mittheilungen*, 1876, showing his previous journey in 1870-73 —EDITOR.

Saïgon, Cochin China, that the natives of the country, especially in the more northern districts of Indo-China, have the great toe of the foot separated from the others like the thumb of the hand, so that it can be used, in a limited degree, in the same way. This peculiarity is mentioned in Chinese annals so far back as 2300 B. C.

Several Russian travelers have recently made important explorations in Central Asia. M. Potanin has solved many important questions connected with the geography of north-western Mongolia and made valuable natural history and ethnological collections. M. Severtsof has, by a recent exploration of the Pamir, made considerable additions to our knowledge of its physical and geographical features. Some of the peaks in the Pamir were found to be of great height—the Mustagh attaining an elevation of 25,800 feet. The snow line was found to be at 14,000 feet on the northern, and at 19,000 feet on the southern slope of the mountains.

M. Oshanin describes a visit to the upper part of the Muk-sou, a tributary of the Surkhab river. From a notice of his paper in *Nature* we learn that very high peaks inclose the deep valley of this stream, the bottom of which is 8000 feet above the sea level. The Sandal peak is 25,000 feet high. These peaks are covered for two-thirds of their height with snow, and immense glaciers flow from their wide amphitheatres into the valley of the Sel-su river and those of its tributaries. They form together a glacier which descends very low, its lower extremity, one and a-half miles wide, being met with at a distance of fifteen miles from Altyn-mazar at the confluence of the Sel-su, Luk-su and Kainda rivers. The length of this glacier is not less than twenty to twenty-five miles, and it is fed with several other glaciers of very large size. The oscillations in its length have a great importance, as sometimes it advances so far into the valley as completely to bar up the valley of the affluent of the Sel-su, the Baland-kiik; this last thence forms a wide base which afterwards cuts through a passage in the ice and inundates the main valley, destroying the forests. The vegetation in the neighborhood of the glacier is very poor, whilst the lateral valley of the Baland-kiik is covered with rich forests and grass, though far higher than that of the Sel-su. M. Oshanin observed immense quantities of the *Microplax interrupta* Fieb., in the neighborhood of Altyn-mazar. This *Oxycerenina*, which is characteristic of the southern parts of the palæarctic region in Europe, reaches in Central Asia such heights as, in the Alps and Pyrenees, are occupied with representations of the Arctic zone.

M. Fetisoff, the director of the Botanical Garden at Vernoe, has demonstrated that the supposed volcanoes in the Kuldja district are really coal beds in a state of combustion.

Another Russian explorer, M. Pyevtsoff, has traveled from

Kobdo to Kalgan, and thence to Ulassoutai via Urga, in Mongolia. From Ulassoutai he turned west to the Chuyra river, which was reached at Kosh-agach. Nearly the whole of this journey was through unexplored territory. No less than 2700 miles were surveyed and twenty-six points determined astronomically as well by chronometer as by occultations. Barometrical measurements were made during the whole journey, and very rich zoölogical, botanical and mineralogical collections were obtained.

Bangkok, the capital of Siam, is to be united to the telegraphic system of the world by a partly overland and partly submarine line connecting with the one now running to Moulmein.

M. W. Shapira sends to the *Athenæum* (March 13, 1880) an interesting account of a journey of four months during the summer of 1879 in the interior of Yemen, the Arabia Felix of the Romans. He describes it as the most fertile and temperate country on this side of Asia, owing its happiness chiefly to the absence of the Shumum winds—the great curse of Syria and Northern Africa—and its prosperity to its having two rainy seasons of four months each, and consequently two harvests in the year. The mountains make the climate temperate and healthy. Yemen has an area of about 50,000 miles, more than half of which belongs to a series of plateaux from 4000 to 8500 feet above the level of the sea. The boundary line of Yemen is as follows: western side, along the eastern side of the Red sea, from Bab-el-Mandab south to Lohaya north; then north side, from Lohaya north-west to Saada north-east; then from Saada north-east to Aden south-east; then from Aden south-east to Bab-el-Mandab south-west, so that it forms an oblong square of about 110 to 150 miles wide and 450 long. The chief towns of Yemen are situated on the second plateau, from 6000 to 7000 feet above the sea. This plateau is fertile and well watered.

MICROSCOPY.¹

ORGANISMS IN ICE FROM STAGNANT WATER.—During the past season on account of the unusually mild weather, ice has been gathered quite extensively from stagnant water in canals and ponds. Since the middle of February I have been making microscopical investigations with regard to the purity of such ice. The plan adopted has been to select only those fragments taken from the interior of blocks which appear clean and transparent to the unassisted eye. On melting those fragments and examining the water thus obtained with various magnifying powers up to 900 diameters, bits of vegetable tissues and confervoid growths are usually recognizable at once. I have not noticed animalculæ in an active state in water from ice that has just been melted, but upon allowing such water to settle and become warm at the or-

¹ This department is edited by Dr. R. H. WARD, Troy, N. Y.